AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions of claims in the application.

1-20. (Canceled)

21. (Previously Presented) An apparatus to assist a patient's respiration by delivering air to said patient through a mask, said mask being designed to be connected on a first extremity of a tube, said apparatus comprising:

a control unit to adjust the pressure delivered by a blower of said apparatus,

a first pressure sensor for measuring a first pressure, said first pressure sensor being connected to said control unit, and

a second pressure sensor for measuring a second pressure at an air output of said blower, said second pressure sensor being connected to said control unit;

wherein when a tube is connected between said apparatus and a calibrating shell with a traversing hole having a known airflow resistance coefficient K_S, the air flows from the apparatus to said calibrating shell, and the measured pressures are sent to said control unit, which calculates a tube airflow resistance coefficient K_T based on said first and second measured pressures and said known airflow resistance coefficient K_S,

wherein when a tube is connected to said mask and connected to said apparatus on a second extremity of said tube, the air flows from the apparatus to the mask, and said control unit calculates the airflow at said second extremity of the tube based on said first and second pressures and said airflow resistance coefficient K_T of said tube.

22. (Previously Presented) The apparatus according to claim 21, wherein the control unit comprises an offset compensation means for compensating a possible difference of gauging between the two pressure sensors.

23. (Previously Presented) An apparatus to assist a patient's respiration by delivering air to said patient through a mask, said mask being designed to be connected on a first extremity of a tube, said apparatus comprising:

a control unit to adjust the pressure delivered by a blower of said apparatus,

a first pressure sensor for measuring a first pressure, said first pressure sensor being connected to said control unit, and

a second pressure sensor for measuring a second pressure at the air output of said blower, said second pressure sensor being connected to said control unit;

wherein when said tube is connected to said mask and connected to said apparatus on a second extremity of said tube, the air flows from the apparatus to the mask, and said control unit calculates the airflow at said second extremity of the tube based on said first and second pressures and an airflow resistance coefficient K_T of said tube; and

wherein the control unit comprises an offset compensation means for compensating the possible difference of gauging between the two pressure sensors.

24. (Previously Presented) The apparatus according to claim 23, wherein when said tube is

connected between said apparatus and a calibrating shell with a traversing hole having a known airflow resistance coefficient K_S, the air flows from the apparatus to said calibrating shell, the measured first and second pressures are sent to said control unit, which calculates the tube airflow resistance coefficient K_T based on said measured first and second pressures and said known airflow resistance coefficient K_S.

25. (Previously Presented) The apparatus according to claim 23, wherein said offset compensation means comprises:

a microprocessor,

a digital to analog converter connected to said microprocessor in order to convert said microprocessor's digital data to analog data,

an analog subtractor having inputs connected to the second pressure sensor, said first pressure sensor, and said digital analog converter,

wherein when the blower is not functioning, said microprocessor calculates the difference between the first and second pressures measured by said first and second pressure sensors to obtain a value C, and then sends the value C of said difference to said digital to analog converter, which converts said value C to analog data and drives said value C to said analog subtractor,

wherein said subtractor subtracts the second pressure measured by said second pressure sensor and said value C from the first pressure measured by said first pressure sensor and sends the corresponding result D to the microprocessor,

wherein said microprocessor modifies the C value until said result D equals zero, said microprocessor capturing the C value when said result D equals zero, enabling the control unit to correct the difference of offsets between the pressure sensors.

26. (Previously Presented) The apparatus according to claim 25, further comprising an analog amplifier connected to said analog subtractor in order to amplify the signal corresponding to said result D and to send said result D to said microprocessor, thus enabling said microprocessor to have an accurate adjustment of said value C until said result D reaches the value zero.

27. (Previously Presented) The apparatus according to claim 26, further comprising analog to digital converters connected between the microprocessor and said first pressure sensor, between the microprocessor and said second pressure sensor, and between the microprocessor and said analog amplifier, so that the microprocessor is provided with only digital data.

28. (Currently Amended) The apparatus according to claim 23, wherein when at least one filter is placed at said first or second extremity of said tube, ~~and wherein~~ said control unit calculates the airflow at said second extremity of the tube based on said measured first and second pressures, the airflow resistance coefficient K_T of said tube, and an airflow resistance coefficient K_F of said filter.

29. (Previously Presented) The apparatus according to claim 23, wherein said control unit comprises a nonvolatile memory in which the control unit stores two values corresponding to said first and second pressures measured at each of said first and second pressure sensors, when said control unit forces the blower to deliver a determined constant pressure I at one of the two sensors, so that when at least two values corresponding to two different said determined constant pressures I are stored, the control unit calculates an average of said airflow resistance coefficient K_T.

30. (Previously Presented) The apparatus according to claim 23, wherein said control unit comprises an estimation module connected to a means for detecting the patient's breathing parameters, such that the estimation module determines when the patient is inspiring or expiring, and in response determines the pressure to apply to the patient's mask, so that the control unit adjusts the pressure delivered by the blower.

31. (Previously Presented) The apparatus according to claim 30, wherein the control unit comprises a nonvolatile memory in which a clinician can enter clinical settings comprising at least the treatment pressure and possibly the pressure to apply according to the patient's breathing parameters, said estimation module applying the pressure according to these clinical settings and to the patient's breathing parameters.

32. (Previously Presented) The apparatus according to claim 31, wherein the patient can enter patient settings in said nonvolatile memory, said estimation module applying the pressure according to said patient settings and to the patient's breathing parameters within bounds given by the clinician settings.

33. (Previously Presented) The apparatus of claim 30, in which the estimation module is able to determine that an event (E_1, E_2 or E_3) occurs in said patient's breathing, thus enabling said control unit to adjust the tension to apply to the blower to adjust the pressure at said patient's mask.

34. (Previously Presented) The apparatus of claim 30, wherein said means for detecting the patient's breathing parameters enable the control unit to compute the airflow at said patient's mask, said estimation module determining that an event (E_1, E_2 or E_3) is occurring with the airflow parameters or shape.

35. (Previously Presented) The apparatus according to claim 30, wherein said estimation module has an inspiration output where said estimation module sets the first pressure value during inspiration and wherein said estimation module has an expiration output, and wherein said estimation module sets the first pressure value during expiration, said control unit comprising a switch which is connected alternatively to the inspiration output or expiration output according to the patient's breathing.

36. (Previously Presented) The apparatus according to claim 30, wherein the apparatus further comprises a starting means which when actuated enables the estimation module to determine if a breathing activity is detected, the estimation module sending an instruction to stop the blower if no activity is sensed after a given delay.

37. (Previously Presented) The apparatus of claim 23, further comprising:

a Frequency Shift Keying (FSK) modulator which transforms the binary data sent by the apparatus sensors or elements in a modulation of the frequency of the tension applied on a voltage controlled current source, connected to an external power supply, so that the voltage controlled current source transmits the modulation corresponding to the data, and

a FSK demodulator which converts the voltage frequency modulation into binary data and transmits it to the elements, so that each sensor or module connected to the power source is able to receive or transmit information.

38. (Previously Presented) A kit for calibrating a tube used in apparatus to assist said patient's respiration comprising:

the apparatus according to claim 23, and

a calibrating shell with a traversing hole having a known airflow resistance coefficient K_S.

39. (Previously Presented) A process for calibrating said tube used in said apparatus to assist a patient's respiration by using the apparatus according to claim 23, said process comprising the steps of:

connecting said second extremity of said tube to the blower of said apparatus,

connecting said first extremity to a calibrating shell with a traversing hole having a known airflow resistance coefficient K_S,

connecting said first pressure sensor to measure the first pressure at said first extremity of said tube,

switching the blower on,

instructing said control unit to measure the first and second pressures at said first pressure sensor and said second pressure sensor, said second pressure being measured at an outlet of said blower, and

calculating the value of the tube airflow resistance coefficient K_T based on said measured first and second pressures and said known airflow resistance coefficient K_S.

40. (Previously Presented) A process for calibrating the tube used in apparatus to assist said patient's respiration, and for calibrating the tube by using the apparatus according to claim 23, said process comprising the steps of:

(1) connecting said second extremity of said tube to the blower of said apparatus,

(2) connecting said first extremity of said tube to a calibrating shell with a traversing hole having a known airflow resistance coefficient K_S,

(3) connecting said first pressure sensor to measure the first pressure at said first extremity of said tube,

(4) switching the blower on,

(5) fixing at a value I the pressure provided and measured on one of said two pressure sensors,

(6) instructing said control unit to measure the pressures at said first pressure sensor and second pressure sensor, said second pressure being measured at an outlet of said blower,

(7) storing said first and second pressures as a measured pressure values associated with said value I,

(8) repeating steps 5 and 6 a number of times N, said value I being different for each time, so that each of said measured pressure values are associated with one value I, and

(9) calculating on average of the airflow resistance coefficient K_T based on said first and second measured pressures and said known airflow resistance coefficient K_S.

41. (New) The apparatus of claim 21, wherein said first and second pressure sensors sense the pressure at both extremities of said tube.

42. (New) A process for assisting a patient's respiration by delivering air to the patient through a mask, comprising the steps of:

providing an apparatus comprising a control unit for adjusting the pressure delivered by a blower of said apparatus, a first pressure sensor and a second pressure sensor, said second

pressure sensor being provided at an air outlet of said blower, said first and second pressure sensors being connected to said control unit;

providing a tube, a calibrating shell and said mask;

calibrating said tube by

connecting a first extremity of said tube to said calibrating shell with a traversing hole having a known airflow resistance coefficient K_S and connecting a second extremity of said tube to the air outlet of said blower;

switching said blower on, the air flowing from said apparatus to said calibrating shell;

measuring a first pressure at said first pressure sensor and a second pressure at said second pressure sensor;

sending the first and second measured pressures to said control unit, wherein said control unit calculates a tube airflow resistance coefficient K_T based on said first and second measured pressures and said known airflow resistance coefficient K_S;

connecting said first extremity of said tube to said mask and applying said mask on the patient's face;

switching the blower on, the air flowing from said apparatus to said mask; and

measuring a first pressure at said first pressure sensor and a second pressure at said second pressure sensor, wherein said control unit calculates the airflow at said second extremity of said tube based on the first and second pressures and the airflow resistance coefficient K_T of said tube.

43. (New) The process according to claim 42, further comprising the step of:

compensating a possible difference of gauging between said two pressure sensors using an offset compensation means, wherein said control unit further comprises said offset compensation means.

44. (New) A process for assisting a patient's respiration by delivering air to said patient through a mask, comprising the steps of:

providing an apparatus comprising a control unit comprising an offset compensation means for adjusting the pressure delivered by a blower of said apparatus, and first and second pressure sensors connected to said control unit;

providing a tube and said mask;

connecting a first extremity of said tube to said mask, connecting a second extremity of said tube to said apparatus on a second extremity of said tube, and applying said mask to the patient's face;

switching said blower on, the air flowing from said apparatus to said mask, wherein said control unit calculates the airflow at said second extremity of the tube based on first and second pressures and an airflow resistance coefficient K_T of said tube; and

compensating a possible difference of gauging between said two pressure sensors using said offset compensation means.

45. (New) The process according to claim 44, further comprising the steps of:

calibrating said tube by connecting said first extremity of said tube to a calibrating shell with a traversing hole having a known airflow resistance coefficient K_S and connecting said second extremity of said tube to said apparatus;

switching said blower on, the air flowing from said apparatus to said calibrating shell;

measuring the first pressure at said first pressure sensor and the second pressure at said second pressure sensor; and

sending the first and second measured pressures to said control unit, wherein the control unit calculates the tube airflow resistance coefficient K_T based on said measured first and second pressures and said known airflow resistance coefficient K_S.

46. (New) The process according to claim 44,

wherein said offset compensation mean further comprises a microprocessor, a digital to analog converter connected to said microprocessor in order to convert said microprocessor's digital data to analog data, and an analog subtractor having inputs connected to the second pressure sensor, said first pressure sensor, and said digital analog converter,

the process further comprising the steps of:

calculating, when said blower is not functioning, the difference between the first and second pressures measured by said first and second pressure sensors with said microprocessor to obtain a value C, and sending the value C of the difference to said digital to analog converter, which converts the value C to analog data and drives the value C to said analog subtractor,

subtracting the second pressure measured by said second pressure sensor and the value C from the first pressure measured by said first pressure sensor with said subtractor and sending the corresponding result D to said microprocessor, and

modifying the C value until the result D equals zero with said microprocessor, said microprocessor capturing the C value when said result D equals zero, enabling said control unit to correct the difference of offsets between said first and second pressure sensors.

47. (New) The process according to claim 46, further comprising the steps of:

amplifying the signal corresponding to the result D with an analog amplifier connected to said analog subtractor, and

sending the result D to said microprocessor, thus enabling said microprocessor to have an accurate adjustment of the value C until the result D reaches the value zero.

48. (New) The process according to claim 47, wherein said analog to digital converters are connected between said microprocessor and said first pressure sensor, between said microprocessor and said second pressure sensor, and between said microprocessor and said analog amplifier, so that said microprocessor is provided with only digital data.

49. (New) The process according to claim 44, further comprising the step of calculating the airflow at said second extremity of the tube based on said measured first and second pressures, the airflow resistance coefficient K_T of said tube, and an airflow resistance coefficient K_F of said

filter with said control unit, wherein at least one filter is placed at the first or second extremity of said tube.

50. (New) The process according to claim 44, further comprising the steps of:

storing two values corresponding to the first and second pressures measured at each of said first and second pressure sensors in a non-volatile memory in said control unit when said control unit forces said blower to deliver a determined constant pressure I at one of said sensors, and

calculating an average of said airflow resistance coefficient K_T when at least two values corresponding to two different said determined constant pressures I are stored.

51. (New) The process according to claim 44, further comprising the steps of:

determining when the patient is inspiring or expiring with an estimation module connected to a means for detecting the patient's breathing parameters,

determining the pressure to apply to the patient's mask, and

in response, adjusting the pressure delivered by said blower.

52. (New) The process according to claim 51, further comprising the steps of:

entering into a non-volatile memory in the control unit clinical settings comprising at least the treatment pressure and optionally the pressure to apply according to the patient's

breathing parameters, said estimation module applying the pressure delivered according to these clinical settings and to the patient's breathing parameters.

53. (New) The process according to claim 52, wherein the patient can enter patient settings in said nonvolatile memory, said estimation module applying the pressure according to said patient settings and to the patient's breathing parameters within bounds given by the clinician settings.

54. (New) The process of claim 51, further comprising the steps of:

determining that an event (E1, E2 or E3) occurs in said patient's breathing with said estimation module, and

adjusting the tension to apply to said blower to adjust the pressure delivered to said patient's mask with said control unit.

55. (New) The process of claim 51, further comprising the steps of:

computing the airflow with said control unit at said patient's mask based on airflow parameters received from a means for detecting the patient's breathing parameters, and

determining that an event (E1, E2 or E3) is occurring based on the airflow parameters with said estimation module.

56. (New) The process according to claim 51, further comprising the step of

setting the first pressure value during inspiration and providing said estimation module with an expiration output with said estimation module, and

setting the first pressure value during expiration with said estimation module,

wherein said control unit further comprises a switch which is connected alternatively to the inspiration output or expiration output according to the patient's breathing.

57. (New) The process according to claim 51, further comprising the steps of:

determining if a breathing activity is detected with a starting means when said starting means is actuated, and

sending an instruction to stop said blower from said estimation module to said blower if no activity is sensed after a given delay.

58. (New) The process of claim 44, further comprising the steps of:

transforming the binary data sent by the apparatus sensors or elements with a Frequency Shift Keying (FSK) modulator into a modulation of the frequency of the tension applied on a voltage controlled current source, connected to an external power supply,

transmitting the modulation corresponding to the data from the voltage controlled current source,

converting the voltage frequency modulation with an FSK demodulator into binary data,

transmitting the voltage frequency modulation to the apparatus sensors or elements, such that each sensor or module connected to the power source receives or transmits information.

59. (New) The process of claim 44, further comprising the steps of:

providing a kit comprising said apparatus, a calibrating tube and a calibrating shell with a traversing hole having a known airflow resistance coefficient K_S.

60. (New) The process of claim 44, further comprising the steps of:

calibrating the tube by:

connecting said second extremity of said tube to said blower of said apparatus,

connecting said first extremity to a calibrating shell with a traversing hole having a known airflow resistance coefficient K_S,

connecting said first pressure sensor to measure the first pressure at said first extremity of said tube,

switching the blower on,

instructing said control unit to measure the first and second pressures at said first pressure sensor and said second pressure sensor, said second pressure being measured at an outlet of said blower, and

calculating the value of the tube airflow resistance coefficient K_T based on said measured first and second pressures and said known airflow resistance coefficient K_S.

61. (New) The process of claim 42, wherein the first and second pressure sensors are sensing the pressure on both extremities of the tube.